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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/787,412	02/27/2004	Hajime Saiki	Q80149	4528
23373	7590	08/08/2006	EXAMINER	
SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037			PATEL, ISHWARBHAI B	
			ART UNIT	PAPER NUMBER
			2841	

DATE MAILED: 08/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/787,412

Applicant(s)

SAIKI ET AL.

Examiner

Ishwar (I. B.) Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 June 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) 2 and 4 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3 and 5-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. This action is in response to the amendment filed on June 22, 2006.

#### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3 and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Enomoto (US Patent No. 6,586,686) further in view of Peterson (US Patent No. 4,963,697) and Ishikawa (US Patent No. 5,243,142).

**Regarding claim 1**, Enomoto, in figure 1 and 2, discloses a wiring substrate, in which a wiring stacked portion including at least one conductor layer (21) including an internal conductor layer (32c) and at least one resin layer (layer between the conductor layer 32d and 32c and also between the conductor layer 32c and the conductor layer 21) is stacked on a principal face of a core substrate (20) including a substantially cylindrical through hole conductor in a through hole (24) extending there through and filling material filling (filled with resin 26, figure 2E with plating in the hole) the hollow portion of said through hole comprising: a conductor (conductor forming pad around the through hole) over a principal face of said core substrate and connected to said through hole conductor; and said internal conductor layer (32c) provided on a side of the resin

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layer opposite said conductor layer, wherein a connection portion (36c) composed of at least one via conductor buried in said at least one resin layer brings said conductor portion and said internal conductor layer into conduction, and wherein no via conductors are positioned above said through hole (see figure 1, there is no via hole above the said through).

Enomoto does not disclose a cover shaped conductor portion covering the end face of the through hole. Enomoto discloses a pad around the through hole. However, the circuit board with the end face of the via hole is old and known in the art. Covering the end face will give better strength and also facilitate additional space for routing the conductive trace.

Peterson, in figure 1, discloses a circuit board with the end face of through hole in core substrate (102) covered with conductor layer (105).

Ishikawa, in figure 1, discloses a circuit board with the end face of through hole with a conductor (6).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the substrate of Enomoto with a cover shaped conductor portion covering the end face of the through hole, as taught by Peterson and Ishikawa, as is old and known in the art and will provide better mechanical strength at the through hole structure.

**Regarding claim 3**, the modified circuit board of Enomoto discloses all the features of the claimed invention as applied to claim 1 above but does not disclose a

distance from a center axis of said at least one via conductor constructing said connection portion to an outer edge of said through hole is from 125  $\mu\text{m}$  to 500  $\mu\text{m}$ . However, the distance will be decided based on the routing of the conductor traces to optimize the space available to increase the trace density for connecting the components. Further, optimization of the available space will help in reducing the size of the circuit board.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the circuit board of Enomoto with a distance from a center axis of said via conductor constructing said connection portion to an outer edge of said through hole is from 125  $\mu\text{m}$  to 500  $\mu\text{m}$  to optimize the available space on the circuit board with better routing of the traces.

**Regarding claim 5**, the modified board of Enomoto discloses all the features of the claimed invention as applied to claim 1 above including a first earthing conductor (21 along with the endcover on the through hole as applied to claim 1), a second earthing conductor (32c and 32d), and connection portion including via (36c and 36d) and further recites a transmission line (two of the middle conductor line 32c) and further recites no via conductor positioned above said at least one through hole.

**Regarding claim 6**, the modified board of Enomoto further discloses the stacked via structure, in which a plurality of filled vias are concentrically contiguous to each other at a position avoiding that above said through hole (36c and 36d, see figure).

**Regarding claims 7 and 8**, the modified board of Enomoto discloses all the features of the claimed invention as applied to claim 1 above including a first earthing conductor (21 along with the end cover on the through hole as applied to claim 1), a second earthing conductor (32c and 32d), and connection portion including via (36c and 36d) and further recites a transmission line (two of the middle conductor line 32c) enclosed by the said first and second conductor layer (claim 8) and further recites no via conductor positioned above said at least one through hole (claim 7).

#### ***Response to Arguments***

4. Applicant's arguments with respect to claims 1, 3 and 5-8 have been considered but are moot in view of the new ground(s) of rejection.

#### ***Conclusion***


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (571) 272 1933. The examiner can normally be reached on M-F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571) 272 1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

IBP  
August 6, 2006

  
ISHWAR PATEL  
PRIMARY EXAMINER